

THE OFFSPRING OF A CAPTURED FEMALE  
*BASILARCHIA PROSERPINA*.

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A female *Basilarchia proserpina*, taken at Springfield, Vt., August 14, 1908, refused to oviposit on the leaves of any available species of birch, poplar, or willow, but when furnished with wild cherry<sup>1</sup> leaves deposited thirty-one eggs, from sixteen of which offspring were reared to maturity. Of these offspring, nine (five males and four females) closely resembled the mother, and seven (four males and three females) were of the white-banded arthemis type, called by Edwards (1879) form *lamina*.

The accompanying plate shows the mother — much the worse for wear after her long captivity — and four of her offspring, a pair of each type. The entire series is now in the Museum of Comparative Zoölogy at Harvard University.

These observations, considered in the light of the Mendelian principles of heredity, give fresh support to the view of Scudder (1889) and others, who have believed *proserpina* to be a hybrid between *arthemis* and *astyanax*. The observed facts accord with those noted by Edwards, who in 1877 reared three *arthemis* and one *proserpina* from eggs deposited by a *proserpina* captured in the Catskill region; and in addition they bring out some new points:

First, the evidence of *proserpina's* hybridity furnished by her choice of an *astyanax* food-plant. In the opinion of collectors generally, the occurrence of a *Basilarchia* larva upon wild cherry plausibly identifies it as *astyanax*; and I find no record of the use of this food-plant by *arthemis*.

Second, some basis for a guess as to the specific identity of her mate. Springfield, Vt., is north of the zone in which *proserpina* ordinarily occurs, and it seems probable that the male parent of this diverse brood was of the *arthemis* (*lamina*) type.

Third, the approximately even division of the offspring between the two types, in a region where *proserpina* has heretofore been

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<sup>1</sup> *Prunus serotina*.

unknown, while *arthemis* (*lamina*) is abundant, and always, so far as observation has shown, breeds true.

Edwards (1877, 1879) drew from his observations the conclusion that *arthemis* (*lamina*) and *proserpina* were to be referred to a single dimorphic species, flying in company with *astyanax* along the narrow zone where their ranges overlapped,—indeed dimorphic only in that zone,—yet never interbreeding with the other species. Mendel's work lay buried and forgotten; and no one realized that this dimorphism might under certain circumstances be a criterion of hybridity. The occurrence of other apparently hybrid Basilarchias (*astyanax-archippus* and *arthemis-archippus*) has been recorded (see Scudder, 1889, and Field, 1904), but its full meaning seems to have been overlooked. The cumulative significance of the various published observations of the genus Basilarchia in the eastern United States is contrary to Edwards's interpretation.

Our working hypothesis may now be that *proserpina* is a hybrid between *arthemis* and *astyanax*, in which the dark coloring of *astyanax* incompletely dominates the white band of *arthemis*.<sup>1</sup> In the narrow belt in which the hybrids commonly occur, these heterozygous individuals must often breed together, producing offspring of which 50 per cent. must resemble the parents (*i.e.*, are heterozygotes), while 25 per cent. are pure dominants (*astyanax*) and 25 per cent. are pure recessives (*arthemis*).<sup>2</sup> Farther north, where *astyanax* seems not to thrive, but the recessive white-banded *arthemis* holds sway, occasional stray examples of *proserpina*, mating with *arthemis*, will yield offspring of which 50 per cent. will be *proserpina* and 50 per cent. pure *arthemis*. In this division the Springfield brood probably belongs. South of the zone of hybridization, the white band must be almost swamped; for when *proserpina* mates with *astyanax*, the offspring will all be dark, and half of them will be pure dominants (*astyanax*). The occasional white-banded Basilarchias<sup>3</sup> taken on Long Island or in New Jersey, or in other places south of the usual range of *arthemis*, may be

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<sup>1</sup> Such incomplete dominance is a widely-recognized phenomenon in Mendelian inheritance. See Bateson (1909) and Davenport (1910).

<sup>2</sup> The name *lamina* now appears to be superfluous, as we are assuming that there is but one form of *arthemis*.

<sup>3</sup> *Ursula* [= *astyanax*] var. *albofasciata* Newcomb (1907).

regarded as extracted recessives (*arthemis*), due to the interbreeding of southward-spreading heterozygotes (*proserpina*).

Moreover, wherever either *arthemis* or *astyanax* mingles with the widely-distributed *archippus*, we should look carefully for further evidences of hybridization involving that species.

Viewed thus, the Basilarchias of eastern North America constitute a group of unusual interest to students of organic evolution, and supply attractive material for experimental investigation.

#### BIBLIOGRAPHY.

BATESON, W.

1909. Mendel's Principles of Heredity. Cambridge, Eng.

DAVENPORT, C. B.

1910. The imperfection of dominance and some of its consequences. Am. Nat., xliv, 129-135.

EDWARDS, W. H.

1877. Notes on *Limenitis proserpina* and *arthemis*. Can. Ent., ix., 114.

1879. Butterflies of North America, II, *Limenitis* I. Boston and New York.

FIELD, W. L. W.

1904. Problems in the genus *Basilarchia*. Psyche, xi, 1-6, 3 pl.

NEWCOMB, H. H.

1907. Description of a new variety of *Limenitis ursula*. Psyche, xiv, 90-91, pl.

SCUDDER, S. H.

1889. The Butterflies of the Eastern United States and Canada, with special reference to New England. Cambridge.